AMENDMENT TO THE ABSTRACT

Improved Wavefront Sensor Using Hybrid Optical/Electronic Heterodyne Techniques

Abstract of the Disclosure

A hybrid optical/electronic wavefront sensor includes an electro-acoustical device used to upshift an optical reference signal. An optical test signal and the frequency upshifted optical reference signal are optically heterodyned to create a signal having a frequency equivalent to the beat frequency of the two signals, for example, the RF driving frequency of the Bragg cell. The optically heterodyned signal is then converted by way of a detector to an electronic signal having the same phase as the optical test signal. The output of the detector is a sinusoidal signal having the same phase as the phase of the optical test signal. This signal is filtered by way of an AC filter and mixed with a second clock signal, for example, a clock signal that is offset in frequency from the electro-acoustical drive signal by a frequency, for example, between 100 kHz and 1 MHz. These two signals are mixed by way of a mixer. The low frequency product of the mixer is passed by way of a filter and converted to a square wave by way of a comparator. The output of the comparator is applied to a simple pulse counter and used to disable the pulse counter. The pulse counter counts the clock pulses while it is enabled and is linearly related to the difference in phase between the optical test signal and the frequency upshifted signal.